

**Sampling and Analysis Plan
Tulalip Wastewater Treatment Plant
Effluent Monitoring Program**

Submitted by

The Consolidated Borough of Quil Ceda Village

Tulalip Indian Reservation, WA

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ACRONYMS

EPA	U.S. Environmental Protection Agency
MCL	maximum contaminant level
QAPP	<i>Quality Assurance Project Plan</i>
SAP	Sampling and Analysis Plan
TBD	To Be Determined
UV	ultraviolet

INTRODUCTION

This Sampling and Analysis Plan has been developed for collection of wastewater effluent samples from the ultra filter membrane wastewater treatment plant operated by The Consolidated Borough of Quil Ceda Village (Tulalip Indian Reservation, State of Washington).

This Sampling and Analysis Plan (SAP) was prepared considering two discharge options. Over the short-term (approximately 6 to 8 years), the discharge will be routed to subsurface infiltration basins. The basins will infiltrate treated effluent into the shallow groundwater aquifer. The effluent will be ultraviolet (UV) disinfected prior to infiltration. Under this discharge option, the groundwater must meet Tribal Drinking Water Standards. These standards match U.S. Environmental Protection Agency (EPA) Drinking Water Standards [maximum contaminant levels (MCLs)]. In addition to infiltration, a portion of the treated effluent will be chlorinated and reused for irrigation and casino toilets.

Over the long-term, the plan is to reuse treated effluent in salmon-rearing ponds and to augment surface water flows in Coho Creek and other creeks. Soon, the government anticipates designing and constructing a pilot wetland to test and consider methods to accomplish this augmentation. The effluent will be routed through a treatment wetland prior to being discharged to a constructed infiltration pit. This SAP is the guide for sampling and analysis for work at this location..

SAMPLING AND ANALYSIS SPECIFICS

2.1 LOCATION AND SAMPLE FREQUENCY

Wastewater effluent samples will be collected at the wastewater treatment plant at a location selected to represent the quality of effluent that will be discharged to the infiltration area or surface water (as applicable).

The frequency of sampling is indicated in Table 2-1. Compounds of concern for surface water discharge will be monitored during effluent infiltration to build a database of results prior to discharge to surface water. Analytical methods are described in Table 2-2 of the QAPP.

2.2 SAMPLING METHODS

2.2.1 Procedures for Sample Collection

Wastewater effluent samples will be collected directly into pre-labeled sampling containers. Therefore no decontamination will be required. Each sample will be labeled, chemically preserved (if required), and sealed immediately after collection.

Prior to the sample event, each sample location will be assigned a unique code. Each sample collected at that location would be preassigned an identification code using the sample location followed by other specific information describing the sample. The following example illustrates the sample identification system:

EF-122002-001-0,

Where:

EF	=	Effluent
122002	=	Date
001	=	Station Number
0	=	Code indicating whether the sample is a duplicate, where 0 is assigned for the sample, and 1 is assigned for a duplicate sample.

Table 2-1. Sampling Frequency

Parameter or Parameter Group	Sampling Frequency During Discharge to Effluent Infiltration System	Sampling Frequency During Discharge to Surface Water ^a
Groundwater Level Measurements	Weekly (N1 through N10, S1 through S9, None and B1 through B6, and P3).	
Instrument Parameters		
Dissolved oxygen	Weekly	To Be Determined (TBD)
pH	Weekly	TBD
Specific conductance	Weekly	TBD
Turbidity	Continuous ^b	TBD
Conventional Parameters		
Alkalinity	Monthly	TBD
Ammonia	Weekly	TBD
BOD5	Weekly	TBD
Coliform, Fecal	Weekly	TBD
Coliforms, Total	Monthly	TBD
<i>E. coli</i>	Yearly	TBD
Cyanide	Yearly	TBD
Hardness	Monthly	TBD
Nitrate	Weekly	TBD
Nitrite	Weekly	TBD
Phosphorous	Yearly ^c	TBD
TKN	Weekly	TBD
TSS	Yearly	TBD
Use turbidity as surrogate thereafter.		
Metals		
Antimony	Yearly ^c	TBD
Arsenic	Yearly ^c	TBD
Barium	Yearly ^c	TBD
Beryllium	Yearly ^c	TBD
Cadmium	Yearly ^c	TBD
Chromium	Yearly ^c	TBD
Copper	Yearly ^c	TBD
Lead	Yearly ^c	TBD
Mercury	Yearly ^c	TBD
Nickel	Yearly ^c	TBD
Selenium	Yearly ^c	TBD
Silver	Yearly ^c	TBD
Thallium	Yearly ^c	TBD
Zinc	Yearly ^c	TBD

(Table Continues)

Table 2-1. Sampling Frequency (Continued)

Parameter or Parameter Group	Sampling Frequency During Discharge to Effluent Infiltration System	Sampling Frequency During Discharge to Surface Water
Volatile Organic Compounds ^d	Yearly	TBD
Pesticides ^d	Yearly	TBD
PCBs ^d	Yearly	TBD
TPH ^d	Yearly	TBD

^a Recommendation will be provided in NPDES permit application.

^b Turbidity is continuously monitored as WWTP operational parameter to detect failure or deterioration of membrane treatment system.

^c Monthly monitoring will continue for any compound detected at greater than 80 percent of its effluent limit. Otherwise, monitoring frequency will be reduced to annually.

^d See list in Table 2-3 of the QAPP.

Where appropriate, sample labels and forms will be preprinted with the appropriate sample identification code. The labels will be filled out using waterproof ink and will be firmly affixed to the sample containers and protected with waterproof tape.

The following information will be given on each sample label:

- Project name and number.
- Name of sampler.
- Date and time of sample collection.
- Sample station.
- Sample number.
- Analysis required.
- Preservation.

2.2.2 Quality Control Samples

The following quality control samples should be collected at the WWTP to verify accuracy and precision of laboratory results for this project:

- A minimum of one trip blank will be analyzed each sampling event for VOC samples. If contamination is identified, transfer blanks will be collected and analyzed.
- A minimum of one blind duplicate will be analyzed per 20 samples, or one per year (whichever is greater).

The frequency of quality control samples may be adjusted when the final sampling schedule is

determined. The frequency of quality control sample evaluations described here should be considered a minimum. Additional information regarding quality control is presented in the *Quality Assurance Project Plan (QAPP)*.

2.2.3 Documentation

Sample documents will be carefully prepared so that sample identification and chain-of-custody can be maintained and sample disposition controlled. Sample identification documents will include:

- Monitoring notebooks.
- Sample Data Sheet.
- Sample labels.
- Chain-of-Custody Forms.

Examples of the Sample Data Sheet, Sample Label, and Chain-of-Custody Form are included in Appendix A. Additional information regarding sample handling and custody is provided in the QAPP.

2.2.4 Sample Handling and Custody

Detailed information regarding sample handling and custody is provided in the QAPP. In summary, the following transfer of custody and shipment procedures will be followed:

- Each cooler in which samples are packed must be accompanied by a Chain-of-Custody Form. When transferring samples, the individuals relinquishing and receiving the samples must sign, date, and note the time on the Chain-of-Custody Form to document sample custody transfer.
- Shipping containers will be sealed with custody seals for shipment to the laboratory. The method of shipment, name of courier, and other pertinent information will be entered in the "Remarks" section of the Chain-of-Custody Form.
- All shipments will be accompanied by the Chain-of-Custody Form identifying shipment contents. The original form will accompany the shipment. The other copies will be distributed as appropriate to the Project QA Officer and Project Manager. See QAPP for list of items to be included on the Chain-of-Custody Form.

The samples will be transported and handled in a manner that not only protects the integrity of the sample, but also prevents any detrimental effects due to the possible hazardous nature of the samples. Samples will be personally delivered by a Village employee, or shipped via courier or overnight delivery service to the analytical laboratory within 24 hours of sample collection.

If sent by mail, the package will be registered with "Return Receipt Requested." If sent by common carrier, a bill of lading will be used. Freight bills, postal services receipts, and bills of lading will be retained as part of the permanent documentation.

Copies of the Sample Monitoring Data Sheet, the Sample Container Label, the Chain-of-Custody Form, and Chain-of-Custody Seal are included herein.

2.2.5 Groundwater Level Measurement

A standard operating procedure for groundwater level measurement is provided in Appendix B. Groundwater level measurements will be recorded in a monitoring notebook. Health and safety measures shall be rubber gloves and suitable clothes (boots, long pants, long sleeve shirt, etc.)

2.3 Sample Analyses

The wastewater effluent samples will be analyzed by a Washington State certified laboratory for parameters with drinking water MCLs, and for additional conventional and instrument parameters used to assess treatment performance. Analytical methods and required reporting limits are provided in Table 2-2 in the QAPP.

CHAIN OF CUSTODY

Point of sampling or station _____

Date _____

Sampler _____

Project: _____

Analysis: _____

Time: _____

Comments: _____

Chain of Custody Record & Laboratory Analysis Request

Page _____ of _____
 Number of coolers: _____
 Cooler Temp: _____



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 Analytical Chemist a. sultants
 400 Ninth Avenue North
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ARI Client: _____ Phone#: _____															
Client Contact: _____							Analysis Required								Notes/Comments
Client Project ID: _____															
Samplers:															
	Sample ID	Date	Time	Matx	No Cont	Lab ID									
1															
2															
3															
4															
5															
6															
7															

ARI Project No:	Relinquished by: (Signature)	Relinquished by: (Signature)	Relinquished by: (Signature)
T.A.T. Requested:	Printed Name:	Printed Name:	Printed Name:
Comments/Special Instructions:	Company:	Company:	Company:
	Date: _____ Time: _____	Date: _____ Time: _____	Date: _____ Time: _____
	Received by: (Signature)	Received by: (Signature)	Received by: (Signature)
	Printed Name:	Printed Name:	Printed Name:
	Company:	Company:	Company:
	Date: _____ Time: _____	Date: _____ Time: _____	Date: _____ Time: _____

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Well #: _____

Sample #: _____

Groundwater Sampling Field Data Sheet

Project Number: _____ Date: _____

Project Name: _____ Location: _____

Project Address: _____ Sampled By: _____

Client Name: _____ Purged By: _____

Casing Diameter: 2" _____ 4" _____ 6" _____ Other _____

Depth to Water (feet): _____ Purge Volume Measurement Method: _____

Depth of Well (feet): _____ Date Purged: _____

Reference Point (surveyors notch, etc.): _____ Purge Time (from/to): _____

Date/Time Sampled: _____

Purge Volume Calculation: $(\pi r^2 h)(7.48 \text{ gal/ft}^3)(5 \text{ casing volumes})$ Purge Volume (gallons) for: 2" = $(0.80)(h)$; 4" = $(3.26)(h)$; 6" = $(7.40)(h)$

Calculated Purge Volume (gallons): _____ Actual Purge Volume (gallons): _____

TIME
(2400 hr)CUMULATIVE
VOLUME (gal)PH
(units)Ec
($\mu\text{mhos/cm}$
25° c)COLOR
(visual)TURBIDITY
(visual)

ODOR

OTHER

_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

Purging Equipment: _____ Sampling Equipment: _____

Laboratory: _____ Date Sent to Lab: _____

Chain-of-Custody (yes/no): _____ Field QC Sample Number: _____

Shipment Method: _____ Split with (name(s)/organization(s): _____

Well Integrity: _____

Remarks: _____

Signature: _____

Page ____ of ____

TO:

THE FOLLOWING WAS NOTED:

COPIES TO: _____ SIGNED _____

TO

DATE	JOB NO.		
PROJECT			
LOCATION			
CONTRACTOR	OWNER		
WEATHER	TEMP	° at	AM
		° at	PM
PRESENT AT SITE			

THE FOLLOWING WAS NOTED:

COPIES TO: _____ SIGNED _____

PROJECT NAME _____ PROJECT NO. _____ CLIENT _____

[illegible]

Standard Operating Procedures

STANDARD OPERATING PROCEDURES

Static Water Level Measurement

Objective

The objective of this standard operating procedure is to describe a method for collecting a static water level measurement. Measurements will be made from groundwater monitoring wells accurate to the nearest 0.01 foot from a standard reference point on the well casing.

Materials

The following materials are required for the collection of static water level measurements:

- Well keys.
- Electronic water-level indicator.
- Weighted steel tape.
- Paper towels.
- De-ionized water.
- Health and safety equipment.

Procedure

The following steps will be taken during the collection of static water level measurements:

1. Unlock and open well. Verify well integrity.
2. Lower electronic water level indicator to the water surface.
3. When the sounder indicates that the indicator probe has contacted water, raise and lower the probe to verify exact point at which measurement should be taken.
4. Measure the depth to water, to the nearest 0.01 foot, from the reference point (notch or mark on well casing).
5. Record the measurement, to the nearest 0.01 foot, in the monitoring notebook or on the Groundwater Sampling Data Sheet.
6. Measure total well depth to the nearest 0.1 foot using weighted steel tape.
7. Replace well cap and close and lock protective well casing.

Decontamination

The following steps will be taken during decontamination of down-hole measuring equipment:

1. While winding the equipment up from the well, thoroughly rinse with deionized water.
2. Remove excess water from the equipment with clean paper towels prior to rewinding equipment on the reel.

Notes

Measurements will be made under appropriate health and safety procedures. See SAP/QAPP